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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/308,962	09/02/1999	CARLO CANTERI	32431/DOB/1P	6911

7590 11/21/2001

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EXAMINER

PECHHOLD, ALEXANDRA K

ART UNIT	PAPER NUMBER
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3673

DATE MAILED: 11/21/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/308,962

Applicant(s)

CANTERI, CARLO

Examiner

Alexandra K Pechhold

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 15-17, 19-21, 23-25, 28, 29-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arima (JP 8260500).

Regarding claim 15, Arima discloses the limitations of the claimed invention except for a potential increase in volume of the expanded substance being at least five times the volume of the substance before expansion. Arima discloses a restoring method for an unevenly settled building characterized by setting a plurality of chemical liquid injection rods at the bottom of a foundation of an object structure, injecting a flash setting chemical liquid through the rods, changing the injection points and repeating the injection to lift up the structure together with the foundation to be restored to the normal condition (claim 1). In receiving the chemical liquid injection, the ground bearing the unevenly settled foundation and tilted building body is thereby reinforced and improved (pg 3, lines 23-25 and pg 4, lines 1-4 of English translation). Arima discloses the step of constantly monitoring the level of the soil and/or built structures overlying the injection zone in stating that the rising rate of the structure at the settled section is measured by a measuring instrument in accordance with the progress of the operation, or the level of the floor surface of the building is measured and the chemical liquid injection operation

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is continued until the structure is restored to the normal condition (pg 18, lines 11-15).

Arima discloses on page 15, second paragraph, that a flash setting chemical liquid is injected, diffusing in a nearly circular form within a gelation time of about 3 seconds, and solidifying with sand and soil. On page 13, lines 5-12, Arima discloses a flash setting grout of soda silicate, water, cement, and gypsum, although Arima notes that the composition of the chemical liquid is not restricted to this, and any composition suited for varying the gelation time can be used. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the potential increase in volume of the expanded substance of Arima to be at least five times the volume of the substance before expansion, since Arima states on page 13, lines 5-12 that any suited composition can be used.

Regarding claim 16, Arima discloses on page 14 lines 6-9 that the chemical liquid injection rods (5) are inserted and installed to the required depths in holes. Repeat injections are disclosed in claim 1.

Regarding claim 17, Arima discloses the limitations of the claimed invention except for the different level depths being spaced approximately 1m from each other. Arima simply discloses that the injection rods (5) are inserted and installed to the required depths in holes (page 14, lines 6-9). Arima does note on page 11, third paragraph, that the number of chemical liquid injections rods (5) and the arrangement intervals are established by taking into account the relationship among the foundation area, the estimated weight of the structure, rigidity of the raft foundation, rigidity of the underground beam, etc.. The operating conditions for the injection are varied to meet

the situations of the structure to be restored (page 12, lines 6-8). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the different level depths of Arima be spaced approximately 1m from each other, since Arima states on page 11, third paragraph, that the number of chemical liquid injections rods (5) and the arrangement intervals are established by taking into account the relationship among the foundation area, the estimated weight of the structure, rigidity of the raft foundation, rigidity of the underground beam, etc..

Regarding claim 19, Arima illustrates vertically placed injection rods (5). Arima states on page 16, lines 3-11 that a nearly circular reinforced ground layer (31) in which the chemical liquid solidified with the soil and sand is formed at each injection point. When the chemical liquid is injected in the ground, the chemical liquid permeates among the sand particles, adheres to the sand particle surfaces and solidifies, and serves as a so-called adhesive and reinforces the permeated area as a group of hardened materials. Upon further injections, Arima notes that the injection chemical liquid is diffused primarily in the horizontal direction at the reinforce section not hardened yet and flows in a thin layer generally along the inside of the upper layer of the reinforced ground layer (31) (page 17, lines 7-10).

Regarding claim 20, Arima discloses on page 11, third paragraph, that the number of chemical liquid injections rods (5) and the arrangement intervals are established by taking into account the relationship amount the foundation are, the estimated weight of the structure, rigidity of the raft foundation, rigidity of the underground beam, etc.. Arima also notes that the conditions of the tilted building (1)

are investigated and grasped, and the optimum operation means is examined. At his time, the subsequent operating conditions are established based on the conditions of a ground (30) that supports a tilted building (1) and a foundation (2) page 11, lines 4-9

Regarding claim 21, Arima discloses that a flash setting chemical liquid is used, which diffuses in a nearly circular form centered on the injection point within the gelation time of about 3 seconds, and solidifies together with sand and soil (pg 15).

Regarding claim 23, Arima discloses that the injection points are arranged generally at intervals of about 2m, though the intervals are not limited to this but may be wider or narrower, taking the rigidity of the foundation into account (page 14, lines 16-20).

Regarding claim 25, Arima discloses in claims 1-3 the repeating of the injections.

Regarding claim 28, Arima discloses the limitations of the claimed invention except for injection tubes having an inner diameter of about 10mm. Arima only discloses that a known rod of double pipe structure is used (page 12, lines 11-13). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the diameter of the injection pipes of Arima to be about 10mm, since it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F. 2d 272, 205 USPQ 215 CCPA 1980).

Regarding claims 30 and 33, Arima discloses the limitations of the claimed invention as discussed in reference to claims 15 and 19 above. Arima discloses the limitations of the claimed invention except for a potential increase in volume of the

expanded substance being at least five times the volume of the substance before expansion (claim 30). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the potential increase in volume of the expanded substance of Arima to be at least five times the volume of the substance before expansion, since Arima states on page 13, lines 5-12 that any suited composition can be used.

Regarding claims 24 and 31, Arima discloses the limitations of the claimed invention except for holes provided at an angle with respect to the vertical. Arima does note on page 11, third paragraph, that the number of chemical liquid injections rods (5) and the arrangement intervals are established by taking into account the relationship among the foundation area, the estimated weight of the structure, rigidity of the raft foundation, rigidity of the underground beam, etc.. The operating conditions for the injection are varied to meet the situations of the structure to be restored (page 12, lines 6-8). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the angle of the holes of Arima to be located at an angle with respect to the vertical, since Arima states that the optimum arrangement takes into account numerous factors (page 11, third paragraph), and altering the angle of the hole is a design choice within ordinary skill in the art.

Regarding claims 29, 32, and 34, Arima discloses a restoring method for an unevenly settled building on page 3, lines 23-24.

3. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arima (JP 8260500) as applied to claim 15 above, and further in view of Haekkinen (4567708).

Arima discloses the limitations of the claimed invention except for a laser level apparatus to monitor the level of the soil and/or building overlying the injection zone. Arima discloses that the rising rate of the structure at the settled section is measured by a measuring instrument in accordance with the progress of the operation, or the level of the floor surface of the building is measured and the chemical liquid injection operation is continued until the structure is restored to the normal condition. Haekkinen teaches in column 3, lines 30-42 the use of a level, taut string, mason's level or other suitable device (not shown) to measure the upward movement. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the measuring step of Arima to include measurement instruments as taught by Haekkinen such as a laser level apparatus, since the use of leveling devices, particularly modern day laser level apparatuses, is known in the art of geotechnical engineering and surveying and Haekkinen teaches the use of any suitable device in column 3, lines 30-42.

4. Claims 22, 27, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arima (JP 8260500) as applied to claims 20 and 21 above, and further in view of Kapps et al (US 4792262).

Regarding claim 22, Arima discloses the limitations of the claimed invention except for the expandable substance comprising a mixture of a first component of polyether polyol and/or polyester polyol, a catalyst and water, and a second component of isocyanate MDI. On page 13, lines 5-12, Arima discloses a flash setting grout of soda silicate, water, cement, and gypsum, although Arima notes that the composition

of the chemical liquid is not restricted to this, and any composition suited for varying the gelation time can be used. Kapps discloses examples of suitable polyether polyols in column 3, lines 1-5. In column 3, lines 27-35, Kapps discloses the additives of water and catalysts. Kapps discloses in claim 6 that the polyisocyanate component is based on crude MDI. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the expandable substance of Arima to comprise a mixture of a first component of polyether polyol and/or polyester polyol, a catalyst and water, and a second component of isocyanate MDI, since Arima states on page 13, lines 5-12 that any suited composition for varying the gelation time can be used.

Regarding claim 27, Arima discloses the limitations of the claimed invention except for a water content of 3.44% by weight. Arima discloses on page 13, lines 5-12, a flash setting grout of 100L of liquid A containing 50L soda silicate and 50L water, and 100L of liquid B containing 60kg cement, 20kg gypsum, and water of the remaining amount, although Arnima notes that the composition of the chemical liquid is not restricted to this, and any composition suited for varying the gelation time can be used. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the water content in the grout of Arima to be 3.44% by weight, since it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F. 2d 272, 205 USPQ 215 CCPA 1980).

Regarding claim 35, Arima discloses the limitations of the claimed invention except for the expandable substance comprising a mixture of polyols and an isocyanate

MDI. On page 13, lines 5-12, Arima discloses a flash setting grout of soda silicate, water, cement, and gypsum, although Arima notes that the composition of the chemical liquid is not restricted to this, and any composition suited for varying the gelation time can be used. Kapps discloses in claim 1 a reaction mixture comprising a polyisocyanate component and a polyol component comprising a mixture of an organic polyhydroxyl compound having an OH number of about 100 to 600 and about 0.1 to 5% by weight dihydric alcohol having a molecular weight of 62 to about 150. Kapps discloses in claim 6 that the polyisocyanate component is based on crude MDI. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the expandable substance of Arima to comprise a mixture of polyols and an isocyanate MDI, since Arima states on page 13, lines 5-12 that any suited composition for varying the gelation time can be used.

5. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arima (JP 8260500) as applied to claim 15 above, and further in view of Schmidt et al (4904125). Arima discloses the limitations of the claimed invention except for heating the injection substance. On page 13, lines 5-12, Arima discloses a flash setting grout of soda silicate, water, cement, and gypsum, although Arnima notes that the composition of the chemical liquid is not restricted to this, and any composition suited for varying the gelation time can be used. Schmidt teaches in column 7, lines 27-34 that the reaction mixture is heated to about 170 degrees C. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid chemical injection of Arima with the heating as taught by Schmidt, since Arima

states on page 13, lines 5-12 that any suited composition for varying the gelation time can be used, and furthermore, finding the most desirable and effective temperature for the injected mixture is a design choice within ordinary skill in the art.

Response to Arguments

6. Applicant's arguments filed September 27, 2001 have been fully considered but they are not persuasive.

Applicant argues that the step of injecting a substance into holes spaced from each other *deep in the foundation soil* is not met by Arima. Yet the exact depth of "deep" is variable, and furthermore Arima notes that "it is possible to optionally meet each situation by adjusting the number of injection points, pressure, injection amount, etc. in accordance with situations (pg 8). Arima also states that the "rods 5 are inserted and installed to the required depths in holes excavated in advance from the top surface of the foundation 2 down to the coble stone layer of the ground 30"" (pg 14). Therefore, depending on the particular situation, the "required depth" could be deep in the foundation soil.

Applicant also argues that Arima does not disclose the step of detecting the moment when the built structure and/or the soil surface overlying said injection zone begins to raise. Yet Arima specifically discloses that the **rising rate of the structure at the settled section is measured by a measuring instrument in accordance with the progress of the operation** (pg 18). Therefore, the moment when the built structure begins to raise would be detected by Arima, since Arima discloses measuring the rate

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at which the structure is rising during the operation. Whenever the rising rate is no longer zero, the moment when the built structure begins to raise has been detected.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexandra Pechhold whose telephone number is (703) 305-0870. The examiner can normally be reached on Mon-Thurs. from 8:00am to 5:30pm and alternating Fridays from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas B. Will, can be reached on (703)308-3870. The fax phone number for this Group is (703) 305-3597.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1113.



Thomas B. Will
Supervisory Patent Examiner
Group 3600